

The ANTIQUE RADIO *and* GAZETTE



OFFICIAL
PUBLICATION OF
THE ANTIQUE
RADIO CLUB
OF AMERICA

VOL. 16

FALL

NO. 3



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It is our intention to have the Gazette published as closely as possible to the following dates:

March 31
September 30

June 30
December 30

The closing dates for receiving material of all kinds in order to have it appear in the next issue would be:

February 15
August 15

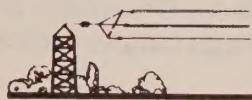
May 15
November 15

The Antique Radio Gazette is published quarterly in Madison, Connecticut

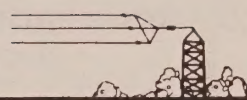
Yearly dues of \$12.00 U.S. currency are payable to ARCA January 1, of each year for members in the USA, Canada, and Mexico. Overseas dues are \$14, which includes airmail postage.

The Antique Radio club of America was incorporated in the State of Kentucky, in September, 1972. The first meeting was held at the Marriott Motor Inn, Washington D.C., on September 23, 1972. At this meeting, by-laws were read and approved and directors selected. We feel that the inception of this Club is a giant step in bringing together those individuals whose chief interest lies in the area of early radio. We invite all collectors and historians of the subject to join the club. A note to William E. Denk, Secretary, 81 Steeplechase Road, Devon, Pennsylvania 19333, will bring you an application blank by return mail.

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President's Page



There are many pleasant reasons for speaking to you through this medium - the President's Page. Our publication, being on a quarterly basis, is most appropriately designated the "Winter", "Spring", "Summer", and "Fall" editions. This gives all of us, and myself in particular, an opportunity to comment on the season in which that edition falls.

Radio, in the past, as it does even today, provides us with the all-important updates as each season passes. The old Farmer's Almanac, used by millions of people for many years, may yet be as accurate as the sum total of our weather forecasters. Here in our part of the country, and you may have made the same observation in yours, it seems that you can tune in 10 different stations and obtain as many opinions on what the weather will be tomorrow.

All of this was just to say that when you receive your copy of the Gazette, and it says the "Fall" issue, you can book on the fact that the leaves are turning their many splendid colors and you will be spending your evenings raking them! Our "Summer" issue makes us realize that hot, dry weather is back. With that thought, I trust our membership suffered no real, permanent damage due to this year's drought! We hope this issue brings you cooler weather.

We are pleased to announce that beginning with this issue, two new articles will appear. (1) Ross Smith will be presenting "Transistor Topics". Needless to say, we are starting to see many collectibles in this area. Many will recall the 10 transistor radios that had 10 transistors with perhaps only 4 or 5 functions. (2) Ed Lyon's article, "The New Generation of Collectible Radios". There are some really nice radios out there that have become a part of America's passion involving the "Art Deco" era. Many of these radios are collectible from an aesthetic standpoint. This puts the pure radio collector in competition with a whole new phenomenon. One day you may be competing with a "Mickey Mouse" collector, the next with a "Hop-a-Long Cassidy" collector, and then - perish the thought - a "Coca Cola" collector. Some may say, and with good reason, "I'll stay out of that part of collecting." This was my reasoning also until a few months

ago I purchased not one, but two Coca Cola radios. (See Phil Collin's new book). We hope you will enjoy these new articles. Please let us know, as well as the writers, your comments. Have you given thought lately to an article that would warm our hearts?

For many years John and Ruth Drake have put their all into this fine publication. They need your help to expand and to keep the Gazette the premier publication that it is. A great big THANK YOU to John and Ruth for their untiring efforts.

I have one more request before closing. We have included a membership application with this issue. If each one will ask a friend to join our club, over the next year we can double the size of our Gazette! If you need more applications, photo copy extras to keep on hand.

Here we are at the conclusion of another event-filled year. Our cold "Winter" issue will come after the first of the year. So, I will say now, "May the warm embers of love embrace us all through the joyous holidays ahead, may peace abound the world over as we pray that the leaders of all nations put aside their weapons and pursue a peaceful year listening to their "radios".

Lloyd McIntyre

OUR NEWEST MEMBERS

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NEWS FROM CHARLESTON

August 1988

Many here are still recuperating from the June National Meet and maintaining a low profile. So the news from here will be short and sweet this month as we mention just a couple of items of interest.

Let me start out with a sincere 'Thank You' for all those who have contributed to the J.E. Moore Memorial Library in the last several months. The response has been great and the entire club is so appreciative of the donations. We have had to add shelf space to accomodate the latest donations. Shelf space requires more room. Which leads me to my next point. The Charleston Chapter has acquired quite a few radios through donations made by individuals who wanted a permanent display for thier radios. Some of our local members have also donated radios to the Club for permanent display. As a result of the space needed for the library and the display of radios, the Local Chapter has started on a 24' x 12' addition to our Chapter Headquarters. All who have seen our modest meeting place know we can utilize the extra space.

Again, on behalf of the entire Club, thanks for the donations that are making the growth of our library and display such a success. Until next time, take care.

W. Blaine Smith
Reporter

Dear John:

I was rather surprised to find my article "Dry Batteries For Antique Radios" published in the latest edition of the ARCA Gazette. I was even mor surprised that there was no author listed for the article! Harrumph!

What that means, of course, is that you are going to get all the inquiries, if any, about the batteries mentioned in the article. Should that happen, feel free to refer them to me. I will answer them to the best of my (limited) ability.

So far as I am aware, all of the batteries mentioned in the article are still available, albeit at slightly higher prices than those mentioned in the article.

Keep up the good work. You guys are doing a fine job with the Bulletin. Enclosed is a complete copy of my article, including

vintage reprints from Radio Broadcast on the use of dry batteries with battery radios.

Sincerely Yours,
Tolbert V. Prowell
1073-15 Lancaster Blvd.
Mechanicsburg, PA 17055

EDITOR'S NOTE: We Goofed!

NEW ENGLAND RADIO CLUB

The NEW ENGLAND RADIO CLUB is a newly formed club and we are actively seeking members. We formed the club in June of this year, and at this point we already have 60 members. By joining our club, and participating in our meets, you will be helping us to establish a sorely needed radio club in New England. Meetings, news letters, and mailings of events are being planned to keep everyone informed of what is happening. We plan to have swap-meet-flea market-get-togethers 4 times a year.

The First Antique and Collectible Radio swap meet will be held on October 23, at the HOLIDAY INN, in NASHUA, N.H., from 9:00 a.m. to 12:00 noon. Tables are being sold for all those who want to SHOW, SELL or TRADE their merchandise. Please make your reservations early as tables are limited and are being sold on a first-come first-served basis. The charge is \$6.00 per table. If you decide to buy table space, you will receive a confirmation. All members will receive a notice 2 weeks prior to the meet.

This is an indoor meet and all the facilities of the Holiday Inn are available.

For More Information Please Contact;

NEW ENGLAND RADIO CLUB

Marty Bunis
422 Day Street
Manchester, NH 03104
(603) 623-8996

Ed Lyon's article, "The New Generation of Collectible Radios" was not ready as we went to press and will be included in the next issue of the Gazette.

ARTICLE
by Mel Comer

As generations move forward -- it becomes apparent the radios we grew up with in our families have kept changing from time to time as new developments keep coming along.

In the early "wireless" days, of which now few remember - except for those remaining, dedicated, experimenters, who could see what was coming, little did we dream then how important a part of our lives radio was to become!!

Except for museums, we rarely see the artifacts of those early days showing up anywhere. Any time they do show up, they are hastily grabbed up by collectors. But -- what is a collector?? It is simply a person of a certain generation who is familiar with the history of past developments, who prizes these items with fond memories. Why do we save and cherish old pictures of our families and distinguished characters -- because it is good for the soul and our way of life!

Each generation has its favorite artifacts - the items they are most familiar with. This holds true in radio -- likewise in antique cars. All of which comes down to the fact that there are now two distinct classes of collectors, depending on which generation one belongs to. There are those whose interests are all before the 1930's period, where radio began to take hold. Then began that interim period where radio became a household item. Production soared -- quality improved -- sets became affordable. Those were the days when beautiful wood cabinets adorned the home and the pleasures derived from them.

Following the war period -- plastics really came into their own -- right on up to the present day, where it is hard to find any radio encased in wood or metal. The plastics have many advantages -- such as durability -- low cost-compact design and others.

Our affluent generation leans heavily now on the collection of these early plastics. The values we hear placed on these astounds the minds of the early collectors!! If the soaring values of these plastics are so high ---- what has happened to the very rare artifacts of old - at the beginning of radio?? It makes us wonder?? There are untold numbers of oil paintings, but just a very few have extraordinary val-

ues. Is this same situation going to happen to our collectors of the early gear??

Perhaps it already has?? When we attend these various radio meets and flea markets, rarely do we see much, if any, of the very early equipment. Is this an investor opportunity?? The antique car market has recently turned to an investor's market -- where the dedicated collector is being crowded out on values.

To each his own and where do we go from here?? Plastics are still found in large quantities, but where do you find the very early equipment that blazed the path of what we have today??

Old saying --- Collect what you know - and are familiar with - the items you really enjoy. Know your collection - but also know the background and history of how it came to being!

If you are a hoarder -- good luck!! You may wind up on easy street. Or - then again, you may get acquainted with your trash man to haul the stuff away??

Buy what appeals to you -- how it was used -- it's history and background - how well it fits into your collection. Sometimes it is not the quantity -- but the quality of the item that is most important. Restorations of old gear are lots of fun -- finding parts - meeting new friends -- all the great game of collecting!!

The Antique Radio Clubs we know were originally organized for the collection and preservation of the early equipment and their history. A new generation has evolved -- another chapter in radio history!! Welcome to the plastic generation!!!

**PAST ARCA PRESIDENT
MUCHOW TO RECEIVE
HONORARY AWARD**

The Secretary/Treasurer's Office has received word that, in November, ARCA member and Past President, Ralph W. Muchow, will receive the RALPH BATCHER MEMORIAL AWARD for 1988, presented by the prestigious RADIO CLUB OF AMERICA, headquartered in New York City. This award is presented annually to a member of the Radio Club of America "who has assisted substantially in preserving the history of radio and electronic communications". Ralph is a fellow of the Radio Club of America.
Congratulations, Ralph!

Old-timer's Notebook

James A. Fred



OLD-TIMER'S NOTEBOOK

James A. Fred

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Dear Old Timer: I used to be able to buy a plug-in replacement for the WD-11 tube. It used an 864 tube and a new base with pins to fit the WD-11 socket. Are they still available and what is the price?

A. These items are still available but at a higher price. The bases are now fabricated from a black epoxy cylinder and a black disc. The pins are the same size and are spaced the same distance apart as the WD-11. I have supplied hundreds of these replacements over the last five years and they are being used in the Radiola III, III A and other radios that require the WD-11 tube.

Current prices are: the plug-in replacement with a new war surplus 864 is \$15.00 for one or two for \$25.00 postpaid. Delivery is usually within 2 weeks. Write to: Antique Radio Labs., R 1, Box 41, Cutler, IN 46920.

Q. I have an RCA model 223, 32 volt DC farm radio. There is a ballast tube in the power unit that is connected in series with the type 84 rectifier tube. Do you know where I can get this ballast tube or if I can replace it with a resistor?

A. This ballast tube is an Ampertite type 5-16. The parts list, in the schematic drawing, shows a 4 pin socket for the ballast with tube shield. Since I have no idea where you could find one, I suggest substituting a 50 ohm, 15 watt, wire wound resistor for the ballast tube.

Q. Where can I get information on Coherer technology, ie, the best gap to use, whether nickel or silver work best, vacuum or CO or N environment is better etc.?

A. I am sorry but I have no answer for this question. If any reader can answer this question he can write to Fenton M. Wood, P.O.Box 2063, Malakoff, TX 75148. I am sure he will appreciate it.

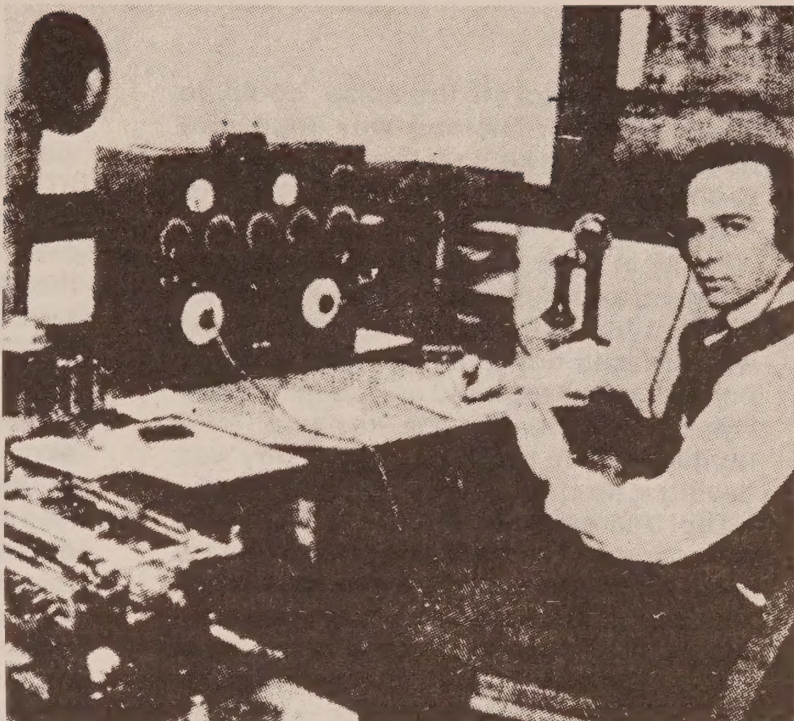
Q. I find the pre-1929 radios use very small capacity filters in their power supplies. I find it hard to buy small value electrolytic capacitors to use as replacements. What can I do?

A. I do not recommend using electrolytics in these old radios. These old radios all used electrostatic capacitors. Electrostatic capacitors are made from high purity aluminum foil and sulphur free insulating paper. If you look at the circuit diagrams of these old radios and "B" battery eliminators, you will find capacitor values like .25, .5, 1, and 2 mfd. You can use tubular capacitors rated at 600 VDC. One Collector-Restorer uses World War II surplus bathtub type capacitors as power supply replacements. Bathtub capacitors are hermetically sealed in steel cases and are filled with oil. Even though these capacitors have been around for 40 odd years, they are usually very good. Another source is the oil filled transmitting capacitors usually rated at 1000 VDC.

I realize that this column is short this time, but if you will all send in your questions we will find room for the answers.

Route #1, Box 41
Cutler, IND. 46920

This print from an old photograph shows a radio operator receiving news dispatches over the famous long-wave radio set designed for the Chicago Tribune by Karl Hassel and R. H. G. Mathews of the Chicago Radio Laboratory. CRL manufactured equipment under the trade name "Z-Nith" which later became Zenith Radio Corporation. This radio set enabled the Tribune to receive news dispatches about the proceedings of the post-World War I Versailles Peace Conference directly from a long-wave radio station in France, thus, scooping their competitors by 12 to 24 hours. Their competitors were receiving their news dispatches via the congested transatlantic cable.



"FIRST KNOWN RAILROAD RADIO"

By James Winnette

The first known railroad radio was designed and built by Radio Manufacturing Company, Chicago - Radio Laboratory, founded by Karl Hassel and R.H.G. Mathews. It was built in 1919. Zenith Radio-Telegraph equipment was used to dispatch Nashville-Chattanooga & St. Louis trains, which became the world's first railroad to successfully dispatch trains by "wireless" telegraphy. The transmitting and receiving equipment was installed at two locations: Tullahoma, Tennessee and Guntersville, Alabama. This communication "First" was to be one of many for CRL, and its successor, Zenith Radio Corporation. Thereby hangs a story which runs something like this.

Divisional headquarters for the Huntsville Division, in 1920, were located at Tullahoma, Tennessee. The twenty-two mile stretch of Tennessee River between Hobbs Island, Ala. and Guntersville, Ala. had always offered difficulties with respect to the dispatching of trains from Decherd down to Gadsen and back. The only satisfactory way was long distance telephone and the cost was tremendous. Indeed, without the telephone, that part of the line south of the river might well have been in South America as far as finding out what was going on and vice versa, North of the river. Then came this new-fangled radio, wireless thing and with it what looked like the answer to a dispatcher's prayer. Could it be done. Had it ever been done. Nobody knew but by golly! We can try it and we did.

E.W. Crabtree, at this time N.C. & STL, - trainmaster at Guntersville, Ala., had been a wireless operator during World War I. He was sent to Chicago, for a refresher course. A hasty survey disclosed that the cost would run around \$800.00 to set up the required paraphernalia and the OK was given to order the equipment from the only place then handling such equipment, Chicago Radio Laboratory, founded by Karl Hassel and R.H.G. Mathews, located at Chicago.

It was decided to set up sending and receiving stations at Tullahoma, Tennessee, and Guntersville Ala. and work was started. At Guntersville, two 90-foot poles were erected and an aerial strung between them, with copper strips, ten feet wide, buried to act as ground. At Tullahoma, complications immediately arose in the erection of poles since the NC & STL office was located over a local bank. This was ironed out and then the Chicago equipment firm jumped the price of the material to \$1000.00. By this time, news of the project had leaked out and railroads were writing to headquarters NC & STL in Nashville to learn how the "wireless dispatching of trains" was working out, - even before the equipment had been received. Finally, the transmitter reached Nashville and a test was made to see "what it would do." The noise was terrific, stenographers were deafened and no one could hear over the phone. It seems that the "rotary gap" should have been uncovered. Later the transmitter was brought to Guntersville

and when turned on, the noise "could be heard uptown". The only way inquisitive hands could be kept off the machine was to change the voltage designation of 110 volts to read 110,000.

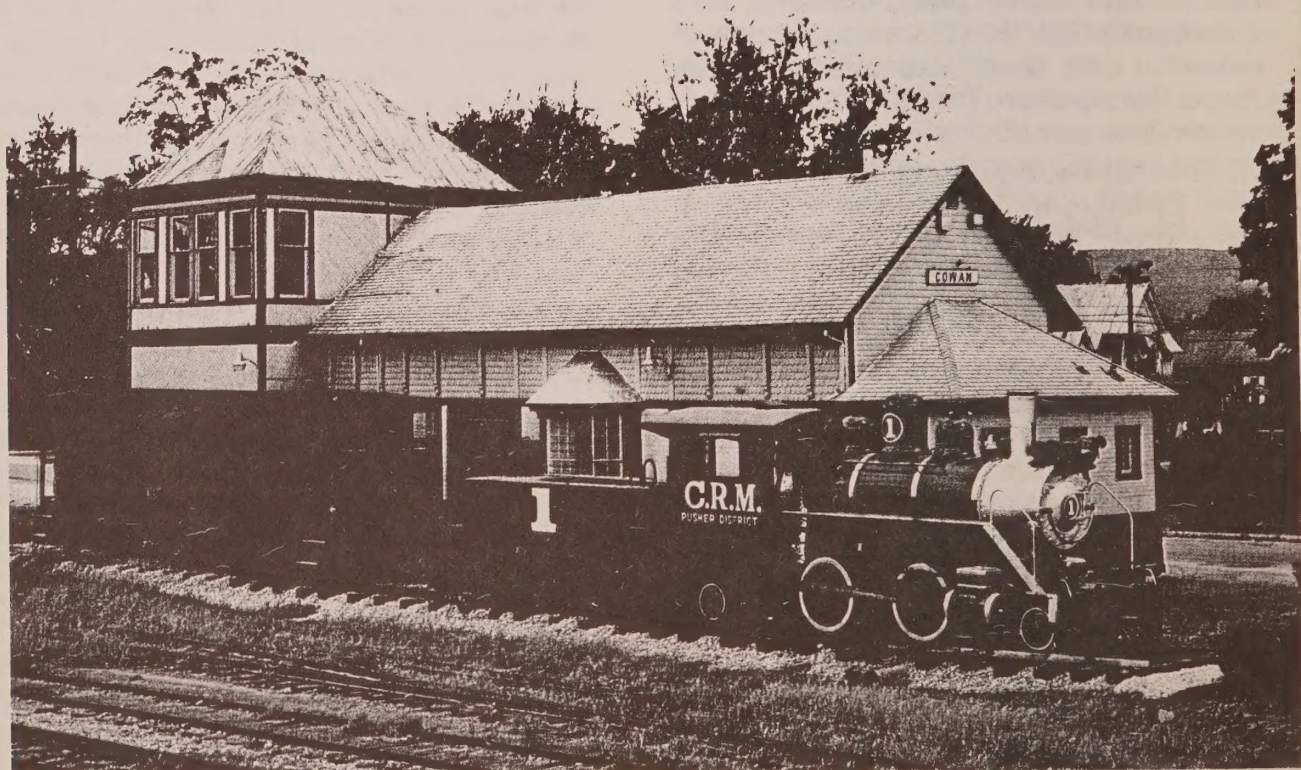
Finally, in 1921, the equipment had been received and installed and the day set for the first full trial. When the sending key was pressed down in the office at Tullahoma, things happened and quickly. Every light in the bank went hay-wire. In a dentist's office down the hall, a lady was having a tooth drilled on. All at once she let out a scream, declaring that the dentist was using a blowtorch. The bank directors were having a meeting when the history making radio dispatching event was initiated. All at once the burglar alarm went off. A quick motion was unanimously carried and the railroad had to find a new office in which to fool around with such crazy things.

Other complications arose. Now the Government insisted that the operators had to have licenses, then it changed the wave length from 425 to 1621 meters, which caused the condensers to break down under the strain. At last, however, on October 31, 1923, came the word that "Operation by Radio Telegraph was inaugurated between Tullahoma and Gunterville."

To the surprise of many, the equipment worked fairly well for about two years. It was around this time that radio station KDKA (a real pioneer in the game) began to broadcast. Programs could be heard over the railroad equipment and it was then that the first world series was heard by radio in this part of the country. Now we sit at home and watch the curve of the ball on the way to the plate.

In the end, the NC & STL gave up the experiment after spending around \$5000.00 on it. The Gunterville station had once more to resort to the now ordinary and commonplace long distance telephone. So while the experiment ended in apparant failure, we are quite sure that much good was contributed to the science of radio operations. Radio engineers made many trips to both Tullahoma and Gunterville and who can deny that out of this effort and experimental work came much of which we now see used in radio dispatching and communication between caboose and locomotive, other trains, between freight stations, mobile agent and etc. "Could Be". Mr. C.R. Stuart, telephone supervisor, NCSTL, helped in the installation of the equipment.

This information from NC & STL Bulletin, and Biographical Sketches of "Great Men in Electronics," by William M. Palmer. and other people on the NC & STL RR Co.



A SELECTIVE AND EFFICIENT CRYSTAL SET

By Bud Bedker

I have experimented with crystal sets to the point where I have now developed a combination of components in a circuit that gives results which I find fascinating. The design uses well-known principles.

Most crystal sets from the early days do not perform very well under present day conditions. They were never intended to be used with loads of stations in the AM band and with the high transmitter powers employed today.

These things were all considered in designing the crystal set I am about to describe. It gives surprisingly good results under the conditions encountered at my home near Buffalo, N.Y.

For the antenna I found either a seven strand 125 foot long wire or five lengths of seven strand wire each 25 feet long and spaced 2 feet apart to give the best all around results. All experimenting and building was done using the later type of an antenna installed in my attic. It is also recommended that you first try this type of antenna when you build your set.

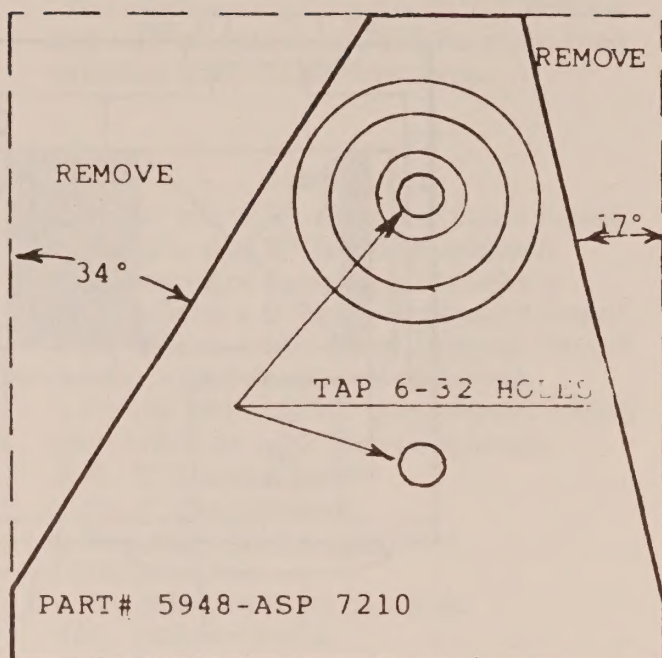
For the receiver I wanted very good selectivity across the entire broadcast band. I also wanted to be able to separate stations not too many wavelengths apart on the dial and still hear each separately.

I wanted maximum distance and volume and I wanted each of these design constraints maximized with no sacrifice to any of the other requirements.

Everyone knows that the heart of any crystal set is the coils so I directed my attention to making very efficient ones. Coil size, wire diameter, spacing of the turns, material and variability all play a part in the end result. So, of course, does preciseness of construction.

For most efficient operation the turning coil assembly must be mounted at least two inches from any other part. This includes even the front panel and the cabinet!

Make all brackets from bakelite. Use very small mounting screws such as 2-56. Mount the variable capacitors to the front panel with 6-32 flathead machine screws. Use $\frac{1}{8}$ " thick by $\frac{3}{8}$ " diameter bakelite spacers. Tap hole already in capacitor to 6-32 thread for mounting screw.



To further the efficiency effort cut away excess metal on the antenna capacitor and carefully remove both rotor and stator plates from the small section of the variable capacitor.

Drill and tap 6-32 hole $\frac{3}{16}$ " deep in center line of shaft and in a piece of $\frac{1}{4}$ " bakelite or plastic rod to extend the tuning shaft $\frac{3}{4}$ ". This will help eliminate hand capacity when tuning the set. These capacitors are available at reasonable cost from:

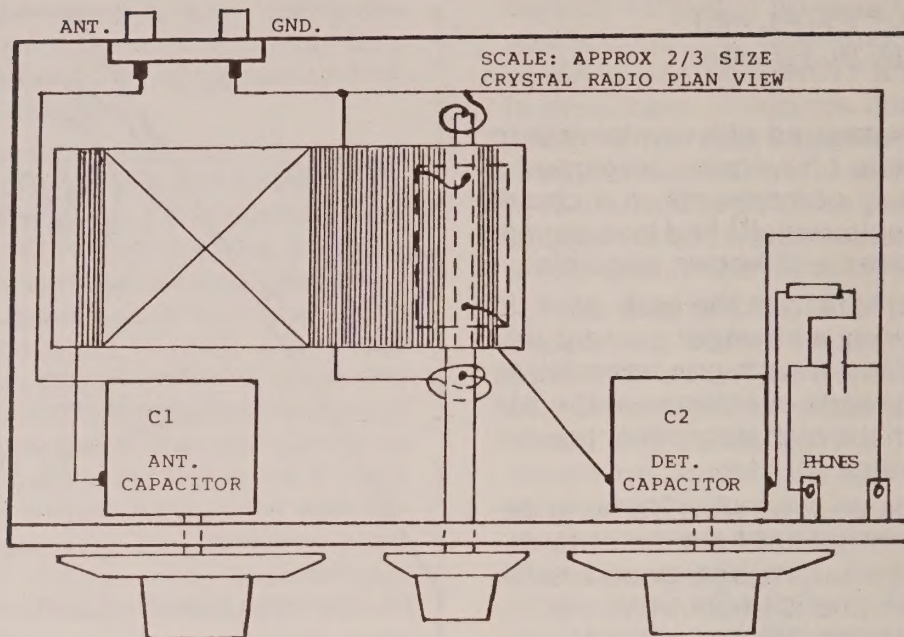
Julius M. Hoffer
24 Cherry Road
Framingham, Mass. 01701

Three inch diameter tuning dials are recommended on both tuning capacitors. These large knobs are helpful because the set will tune surprisingly sharp.

I like a fair sized pointer dial on the rotor coil with a scale of 0-20 graduations over a 20° range glued to the panel. As an alternate a 2"D regular dial will work OK. Once in operation this dial will only be moved over a small angular range.

When tuning the crystal set this dial will allow the station to be brought in rather broadly with the best obtainable volume or very selective with only a minimum loss of volume. Once the station has been tuned in, it is best to go back and recheck all dial settings as they will change slightly.

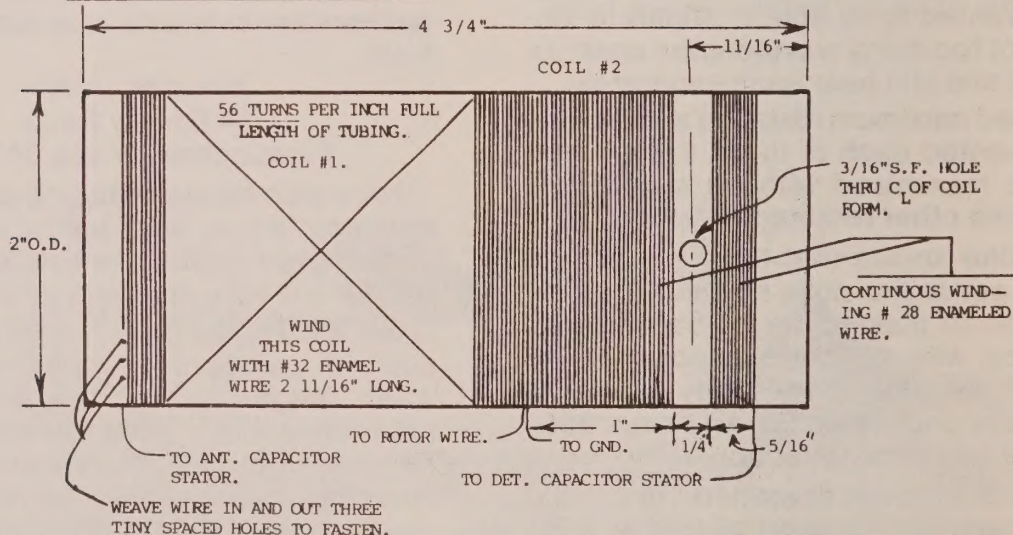
Personally I enjoy tuning the set. After all of the effort required to build the set I hope you do too.



COIL FORM 2" DIA PLASTIC WITH 1/32" THICK WALL.
THREAD GROOVES OUT FULL LENGTH JUST DEEP ENOUGH
TO HOLD #28 WIRE IN PLACE.

COIL FORM DETAIL.
FIGURE 2.

WIND ALL COILS IN THE SAME DIRECTION.



ENLARGED VIEW OF THREAD GROOVE AND WIRE POSITION. USE 60° SHARP THREADING TOOL.

With a little searching the 2 inch O.D. 1/32" thin wall and the 1 5/8" O.D. by 1/64" thin wall plastic tubing for the coil forms may be obtained at a plastic supply store. The same store may also be able to supply the 1/8" thick bakelite or paper phenolic sheet for the front panel and base. The 1/4"D bakelite or plastic rod will probably also be available there.

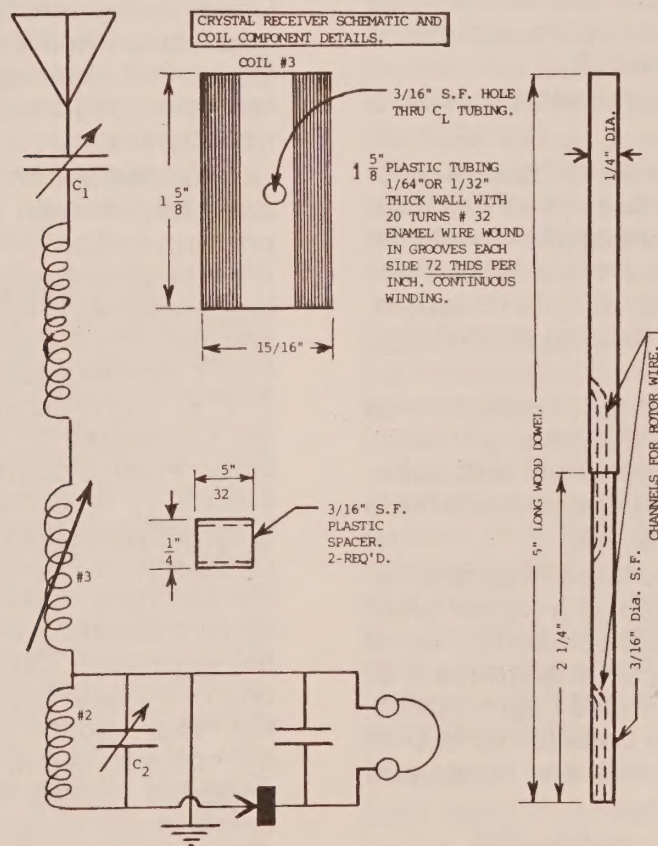
Cutting the 56 and 72 threads per inch grooves will require that you have a lathe or a friend that can do the work for you. A lathe is also necessary for reducing the 1/4"D dowel to 3/16" slip fit and for making the two spacers.

Exact conformance with the instructions is necessary for best receiver performance. Even small deviations may cause significant degradation. This can not be over emphasized. Even little changes which you would think could not possibly change anything may result in a big drop in performance.

You can have a lot of fun with this little set and I am sure that you will be more than satisfied with the performance.

PARTS LIST

- 1 Pc. 1/8" x 6" x 9" Bakelite (Front Panel)
- 1 Pc. 1/8" x 5" x 9" Bakelite or board
- Odd pieces of bakelite for brackets
- 1 Pc. 1/4" Dia x 5" Long Hardwood dowel
- 1 Pc. 2" Dia x 4 3/4" Long Thinwall Plastic tubing, 1/32" thick wall preferred.
- 1 Pc. 1 5/8" Dia x 15/16" Long Plastic tubing with 1/64" or 1/32" wall thickness.
- 2 Pc. 3" Dia dial knob
- 1 Pc. 2" Dia dial knob
- 2 Pcs. ASP 7210 Capacitors. (.000365 Ufd.)
- 1 Pc. .005 Ufd fixed capacitor
- 1 Pc. 1N34A Crystal
- 2 Pc. Phone tip jacks
- 1 Pc. 1/4" Dia Plastic rod
- Assortment of 2-56 screws



Editors Note:

William 'Bill' Hoy is an engineer and inventor, whose career in radio began in 1918 (at the age of 10) and has continued unabated for the past 70 years. He currently resides in Charleston, WV.

RADIO: AS I EXPERIENCED IT

by Bill Hoy

HOW HIGH IS THE SKY

ARCA is remembering a century of progress in wireless communication—we call it radio -- this week. It has been the prime mover in more new technologies, perhaps, than any other discovery in the last century.

A small boy asked his mother "How high is the sky?" She told him, "Very high." "How high?" he repeated. "Oh! high above the clouds". "I can see where it starts," he said, "where does it stop?"

We all like to know where it started, how far we are now, how far there is yet to go. Who can look a century into radio's past to Heinrich Hertz and his crude equipment that could send a signal across a room, to today's space craft orbiting distant planets Saturn, Mars, and Jupiter, commanded from earth by radio and sending detailed pictures back by radio, and guess what the future will bring?

SAW THE VERY BEGINNING OF RADIO

Trying to summarize a part of your life can be frustrating. It is a little like an eighty-year-old couple who have lived half their married life in a beautiful eight-room brick home and find they must move to an apartment with one room for all their treasures. I had to decide what to bring, and what to leave.

I had an opportunity that comes only once in a lifetime. To see the beginning of radio, and to play a part in its growth. I feel, sometimes, that I have been involved with radio and electronics all my life.

When I was born, my father was responsible for the operation of a power plant owned by a large coal company. Part of his work was to change the batteries in all the mine and office phones each month. He brought the used ones to me to play with. Those #6 dry cells, and lamps and switches, were my toys.

INTRODUCTION TO WIRELESS

This is the 70th anniversary of my introduction to what was then called "wireless",

by a gift of books and used equipment. The equipment turned out to be a battery operated wireless transmitter and a receiving set. I don't have any idea of the make of the receiver, it may have been a United job, because it used a carborundum detector unit as United receivers did. That detector worked so well that, until the germanium diode became available, I used a carborundum unit in all the sets I built where a crystal detector was used. The receiver had a tube detector unit with it. I did not use the tube unit, until about 1923 when I decided to try it, considering that it required a storage battery and tapped 22½ "B" battery, I did not think much of it when compared with the Carborundum detector.

FIRST BROADCAST

In 1920, I was known as "That Hoy boy, who's going to burn their house down with that wireless set." I had learned the code, and found someone to talk to on the air. By this time, I had acquired a 2-stage audio amplifier with English Osram tubes. That amplifier was from WWI surplus, which was just becoming available from stores in New York and Chicago. There was not even a hint of broadcasting.

The local YMCA passed the word that the Cox-Harding election returns would be received on their stage, by wireless. When my brother-in-law and I arrived, we found reception had been zero. The set would not operate.

It was decided that as I was a wireless operator, I should see if I could find the problem and operate the set, which was a WWI surplus 4-tube job with a 500 foot long antenna as high in the air as possible. The man who installed the set did not know that it was necessary to observe polarity. The "B" batteries were properly in series, but connected to the set in reverse polarity. When I pointed this out, the local electrician who had connected the set laughed. He said everybody knew it made no difference how the wires connected to the set. After I changed the wires to the correct terminals and the set came alive, the electrician, Otto Michaelson, became one of my best friends for the rest of his life. When I built my first set, Otto came to my home to see it. He said my work was good but I could not solder, he had me come to the shop at noon on Saturday. Otto, and an armature-winder named Walter Reece, spent their lunch hour teaching a kid to solder. I profited from that

lesson all my life.

TUBES, BOTTLENECK OF RADIO

You must not expect too much when you restore one of those old battery operated sets. Almost all pre-1930 battery-operated tubes had thorium impregnated filaments, were low-mu and short-lived because the thorium boiled away. There was a big business in rejuvenating radio tubes. The process was about as effective as it is now for TV picture tubes.

All set builders had to consider battery drain, and limit the number of tubes used. 201 tubes were superior to WD11s and 199's but they consumed much more power from each battery, requiring a storage battery for the filaments and used "B" batteries up more quickly. Another problem was operating costs. Tubes cost as much as \$10.00 each. A 45-volt "B" battery cost \$4.80, it lasted about three months. These prices ran the cost of operation to about \$7.50 a month. That looked like a small fortune to a person earning \$4.00 a day. That is the reason battery sets used few tubes. I built sets with as many as ten tubes for other people. My own favorites were three-tube reflex sets, especially David Grimes inverse reflex sets where the first audio function was performed by the second RF stage and the second audio was fed to the first RF stage. Both RF stages using shielded coils and bottom-neutralized with small variable capacitors. I also built some with regeneration in the detector stage and using a carborundum detector in Interflex fashion.

TUNED RADIO FREQUENCY SETS

As long as designers had only triode tubes available, they were very limited in what could be accomplished. RF stages oscillated near one end, or the other, of the tuning range unless the RF gain was reduced at that point. Triode RF stages gave very low gain. The tubes loaded the tuned circuits, making it difficult to secure adequate selectivity. Attempts to increase circuit gain by using more RF stages resulted in common mode feedback through the wiring and uncontrollable oscillations. These problems made it almost impossible to use gains of more than 100 in RF section. I did build one set with six stages in the RF that was stable, it could be done. My set used three separate 'B' batteries, one for each pair of RF stages. Tubes of that time had very high capacitance between the active elements, causing an

adjustment of one tuning circuit to require the adjustment of other circuits. In a word, when one dial was tuned to resonance it caused an interaction that threw another dial out of tune. This was part of what is now called "Miller Effect," and made tuning almost an art. Neutralized RF amplifiers were almost free from this defect. I believe this was more responsible for the popularity of the Neutrodyne sets than any other single thing. Just the fact that dial settings did not drift around on a Neutrodyne.

Neutrodyne sets had their own problems, as anyone who has built a transmitter with a neutralized amplifier stage will agree. Ideally circuit components would be pure inductance, resistance, or capacitance. In the real world of radio that is not true. Each component is mostly one characteristic, say an inductor, but it contains resistance and capacitance. This is true of resistors and capacitors also. When they are combined in one circuit, they interact in strange ways as the stage is tuned.

Another problem with tuned triode RF stages, the gain is not uniform for all frequencies, but varies as the frequency is changed. It varies, too, with the tracking error of multiple unit tuning capacitors. The selectivity of the set varies in the same fashion. In a TRF set it is almost impossible to correct these faults. I know of none that corrected all.

That designers were able to produce good TRF sets in spite of all these problems proves there were some very good engineers out there then.

I wish I had all the money paid for Geppert Cleartone Units. These were just a simple inductor with a variable capacitor connected across it, arranged so it could be connected in series with the antenna or across the antenna-ground terminals as a wavetrapp to remove interference from those old sets. It seemed everybody had one . . . or two. When one was ordered, two were shipped, at twice the advertised price COD. Many listeners found that two could be used together, to remove interference above and below the selected station.

TOOLS

Until 1925, most radios were assembled by the owner, or the village fix-it-man. I always had one under way. There were very few tools out there. Almost no one had even a simple hand drill. I paid a dollar

for my first one. Soldering irons were heated in open fires, or on top of a kitchen range. Test equipment was practically unknown, not much was needed to work on the simple sets of that day. The set wiring was visible and you could see the power source too. My test kit was a simple battery tester. I adapted a one-tube regenerative set for use as a signal generator during the day when it was almost impossible to hear a station on most sets. Signal strength meters were unknown. As late as 1930, when I was doing research work for a national program to determine the effect of sun-spots on radio reception, we measured sound level by using a calibrated control to reduce that sound in our phones to the point we could no longer understand voice. Tube testers were fairly common, but as unreliable then as when they stopped making them. Most good radio repairmen used tube testers to impress the customer. They knew when a tube was no good. They used the tester to convince the owner. The oscilloscope was unknown then. I think it is one of the most useful diagnostic tools ever made available, except the multimeter.

REAL BREADBOARDS

When radio equipment was first made, each component was free-standing. A tuner, capacitor, or transformer, was mounted in a metal, Bakelite, or in many cases, beautiful wooden box with nickel-plated binding posts. The parts were placed on any handy support, in most cases a table, and connected together for use. This is still done in laboratories, but it wasn't long until some woman said "not in my parlor". To eliminate that daily connecting and disconnecting of the whole set, wooden bases were put to use. All parts were mounted on this base, which was often an actual breadboard, and were permanently wired for use. Breadboards were used because they were available at almost any store for 25 or 50 cents. Atwater Kent used this construction longer than any other company. Most firms correctly reasoned that sales would be better if the sets were constructed in furniture-type cabinets that could be placed in the best room in the home. This had been proven by radio's competition, the phonograph. After all, radio sets cost up to half the cost of an automobile, nobody wanted to hide one in a back-room closet.

CONTACTS WITH PERSONALITIES OF THE DAY

I was fortunate to have contacts with many prominent men of those days. Among those were:

Thomas A. Edison, Hugo Gernsback, Atwater Kent, Powell Crosley, Robert Lecault. Don Mix, McMurdo Silver, Philo Farnsworth, C. Francis Jenkins, Richard Byrd, John Rider, and others. All those men, except two I shall not name, answered all of my letters. They took time to give me help when I needed it. Some of the contacts were personal, some were in the line of business. Mac Silver was a friend from 1925 until his death, which I still think was an accident. Built a friendship with Don Mix after the publicity given his trip to the Arctic. Worked with him on design and construction of a very small emergency transmitter and receiver for the Byrd Antarctic Expedition of 1929. The small sets used 199 and 120 tubes working on dry batteries. It is my understanding they were used while Byrd was there. I was monitoring the Byrd plane when it called the New York Times Station, I believe, to announce they were crossing the Pole on Nov. 28, or 29. It was about Midnight, so could have been either day. Those small sets were built with baseboard and panel, nothing special except as small and light as we could do them.

TAT TRANSMITTER

About the same time as the Byrd project, John McKnight, who had helped on that project, went to Transcontinental Air Transport where he had been asked to provide radio communication for their passenger planes. They needed a transmitter for the pilots use and John asked me to construct one. The planes had a space behind the passenger compartment, for baggage and mail I suppose. We were told we could use a small portion, about four cubic feet, of that space for our equipment. I put all equipment, including ten 45volt Burgess batteries for plate power, in that space. Because of the tremendous vibration and exhaust noise in the front of the Ford-Stout Trimotor Airplane, a microphone that could be understood could not be found. Only carbon mikes were available for our use, and they made a loud noise like maracas when they were disturbed by the engine vibration. The noise level was so high in those old planes that passengers

were almost deaf for a day, after flying one day. Because of this problem, the transmitter was CW only, and built on our trusty breadboard using 5-ply aircraft quality plywood. It was suspended in a strong wooden box-frame with bungee cord, or shock cord, a very strong braid-covered elastic cord used many places in airplanes of those days. Speaking of bungee cord ... I had thought it was extinct, like so many of the other things of that time. Just recently, I saw an account on my TV that it was used by daredevil British bridge jumpers to stop their fall before they reached the water. So bungee cord must be used there, today.

My first set's frequency was too unstable because of plane vibration and set design. The second one used a 112 master oscillator driving a 112 tube as power amplifier. The oscillator was as small and solid as we could make it. The power amplifier used the same plain vanilla coils and capacitors used in the first set. Still mounted on the same trusty breadboard. The set had almost exactly the same schematic arrangement as the CW portion of the BC-191 transmitter used in WWII large aircraft except the set was less powerful. I sometimes wonder. . .

Everything had to be mounted in a way it would not shake loose. Take my word, those planes vibrated. You would think, sometimes, your teeth would shake out. To get around the vibration problem all parts were mounted with brass screws, using two locked brass nuts, soldered in place. Large washers were placed under all screwheads and nuts. The pilot had to learn code. He had a key strapped to his leg. He was asked questions and answered with "y" for yes, "n" for no. Some pilots would spell out the words. They could send any message, of course. All transmission to the plane was by voice. These tests lasted almost all summer, when they were completed TAT wanted me to remain with them. I had heard TAT would have to go out of business unless they could find a buyer, or merge with another company so I rejected their offer. I returned to my home and have no knowledge what use was made of the data.

Transcontinental Air Transport was merged with Western Air Express to form Transcontinental Western Air Express, which we now know as TWA.

WORK FOR US GOVERNMENT (CAA-FAA)

After the work for TAT I worked at Charleston's Wertz Field some, then had no more contacts with planes until 1956, when I accepted a position with the Civil Aeronautics Administration as an Electronics Specialist in Electronic Aids to Navigation and Landing. I was assigned to the Kanawha Airport Office until my retirement from Government Employment.

I was asked to speak of my inventions. While all were electronic, only a few were in radio and most of them were in test equipment, using newer techniques to accomplish a test more accurately, and/or using fewer components... Which means less cost to manufacture and less cost to the user. Some were protected by patent, some by copyright because a patent wasn't feasible. A few are:

- Developed open-wire line for use in long television lead-in lines.
- High powered amplifier.
- Four and Five-channel stereo, which is in use in some movie sound systems, and was produced for home audio systems, in a very simplified form, by DYNACO.
- A counter-type FM demodulator, which was sold to Fisher for use in their receivers.
- A digital volt-ohmmeter circuit that is used in many low-cost meters because it saves the manufacturer about two dollars on each instrument yet can be very accurate.

Speaking of inventors, not patents, most of us are inventors. Every time one improvises a repair or modifies a piece of equipment to perform a new task or do the old one better, or at less cost, he is inventing. It might not be possible to secure a patent, but unless it was copied from someone else's work it is invention.

It often pays, when you complete your work and it is satisfactory to you, to examine it carefully to see if you have something that is really new. I have never said, after breakfast, "I am going to invent something today." I have always done it because I had a need for something I couldn't buy, then saw the possibilities in the result.

FINISH IT

As I said before, I have been in radio electronics almost all my life, if I had to do it over I wouldn't change a thing... Except get into aviation radio sooner. It is fine, rewarding work, for anyone with the qualifications for it.

MEL'S CORNER



Have you ever stopped to consider or compare what goes on these days between a radio of the early 1920's -- and a modern pocket transistor radio??

Let's start with a transmitter of modern design -- putting out a very narrow frequency band rigidly controlled from a comparatively small antenna atop a tower. A transmitter of the 1920's was a sight to behold!! Multiple towers with a series of parallel wires strung between spreaders - for hundreds of feet - and long wave antenna for miles! Those familiar towers are now long gone!!

The average receiver of early twenties suggested an antenna of at least seventy-five feet to one hundred feet or more. Roof top or poles, well insulated, some areas four wire flat tops the higher the better! To find another radio enthusiast of early days, you scoured the town looking for antennas! Knock on the door and get acquainted.

The antenna was one thing -- but a good ground was important! The cold water pipe would suffice in many instances. But the really dedicated fellows would dig a six foot hole in the back yard-burying old car radiators-copper water boilers-and moisturize the area--all to get a good ground. Then comes the huge lightning switch! At the approach of a severe thunder storm, it was often necessary to go out and throw that switch to ground.

Well we remember the antennas of those days with all their many problems. City apartment house roofs were a mess with wires running everywhere!! Arguments between neighbors when found tampering with the wires or tapping on a neighbor's wire.

Gone are the days for the broadcast listener with those extensive antennas and rugged grounds. What used to require stretches of hundreds of feet, now boils down to a little gadget inches long!! The

ferrite antenna - buried in a pocket sized transistor radio.

The tune section of a twenties radio or before-had all kinds of coils-of every description!! Slide tuners-loose couplers honey comb coils--plug ins--tap switches--many variations. Nowadays you have to look hard to find the tune coil in a transistor. Same applies to the tune condenser--- Now-a tiny midget-but covers the range of broadcast.

The tube section in the old days took up loads of space! Sure-they were beauties to look at--and expensive to replace! Rheostats and audio transformers added to the space requirements. But now--what do we see?? Simply a little dot - on a printed circuit board! What used to be many pounds of equipment can now be measured in ounces.

We collectors of antique radios will never forget the early radios of yesterday!!! With all their beauty and fine design- with and without cabinets that glistened on the table-or otherwise--we cherish these! Sure--tone quality has been greatly improved! But then it's fun to listen to what our forebears heard-and the way they heard it-as radios came along.

A collection these days should have at least one old time radio with a horn or ear-phones in working order. It takes little to receive the powerful broadcasters of present times.

There is no need for an extensive antenna system on these old sets. However, we have a few of our most dedicated collectors who like to keep everything original, going after the DX stations in far away locations.

How well do they perform today? Is this an indication as to how well they performed then?? These collectors have been making comparisons of various commercial receivers--and here is what we hear as results.

The popular series of CR-9 Grebe's --tune broad as a barn! That is--just until they are treated with a heat lamp on the coils to eliminate any remaining moisture which you can not see. It works! We hear surprising results from the Aeriola and Radiola Seniors. Properly cleaned up the early Paragon sets are no slouch on performance either!! Then come those early Crosleys with regeneration as well. It is easy to see how these popular low-cost little sets made such a big splash on the market in the manner of which they perform.

The set of the 1920's that still amazes everybody in actual performance--still remains the Westinghouse RADA--a prize among the collectors. Not everybody will agree on this-----but come on, fellows, let's hear your views on this--what do you have to offer??

Cheerio!!



All ads and Swap Shop items are printed in the Gazette free of charge. We do ask that you write your ad on a separate sheet of paper, type if possible, or print, and be sure to include your name and address. We reserve the right to edit all ads. ARCA is not responsible for any transactions, of course.

METER REPAIR: Send your requirements to: Ye Olde Meter Cellar c/o Leonard Cartwright 113 Sea Terrace Way Aptos, CA 95003

FOR SALE: Radio Broadcast, 2 Vols. bound, Nov. 1924-Oct. 1925 \$50.00; Radio Journal, Oct. 24 \$10.00; Radio Listeners Guide, Mar. 1926, \$12.00; Federal 417 (see P211-Alan Douglas Book) \$200; RCA Victor 'Lumiere' cone spkr, \$125.00; AK "G" Horn, \$110; DeForest LS300 Horn, \$110.00; also arcturus tubes

TRADE: WD11, brass tipped; Wilson Utensils Co. 'Moon' horn; DeForest D7A; Radio Age Magazine Vol. 1, No. 1 & next eleven issues bound;

WANTED: Catalin, mirror and novelty radios - Top Prices Paid! Paying over \$1000. For any pre-1943 TV; Buying Post War's as well. Harry Poster, Box 1883, So. Hack, NJ 07606 (201)794-9606 days.

WANTED: 1932 issues of RADIO magazine to complete my set, also Brightson Blue Tubes. Floyd A. Paul, 1545 Raymond Ave., Glendale, CA 91201 (818)242-8961

FOR SALE: Atwater Kent Chasis including most inside parts. Mod.# 376 Wards floor model push button Model#?. Philco Mod #41-608 Chassis and most inside parts. Philco Type 60 floor model. All radios in this article need to be restored. Many new and used old parts, and approximately 3,000 new and used tubes on stock. Cribbs Repair Shop., 18 Mahoning Road, Home, PA 15747

'MECHANICAL TELEVISION'. Stop Wondering and Find Out About It. Free Info. Send a SASE (2 Stamps) to: Pete Yanczer, 835 Bricken, St. Louis, MO 632122

SALE: Philco 49-905 with AM-FM bands. Size 18" long 12" high - 10" deep. Federal model 50 has never been fired-up. Looks great - continuity of coils unknown: Make offers. Roger Cox, 1411 Medford Rd., Wynnewood, PA 19096

WANTED: 1930's type 16 inch transcription turntable and pick-up arm. James Fred, RI, Cutler, IN 46920.

WANTED: Western Electric 215-A, VT 5 and 955 acorn vacuum tubes. Thad Drogoski, 507 Coal Valley Rd., Clairton, PA 15025

WANTED: for Philco model 84. Tuning condenser, on-off switch, dial scale, dial pointer & cabinet. William Albohn, 150 Walter Ave., Thornwood, NY 10594

WANTED: Six wafer type 'four prong' tube sockets. Instruction manual for Western Electric 4B or 4D super hetrodyne. Tad Drogoski, 507 Coal Valley Rd., Clairton, PA 15025

WANTED: Any literature instructions etc. on Radiola VII - originals - reprints - I have a beauty!! David Moore, 3213 Regal Oaks, Pearland, TX 77581. (713) 485-1705

WANTED: Chassis for Automatic Radio Mfg. Co. "Tom Thumb Midget" or will trade beautiful cabinet for similar cathedral radio. Peter Oppenheim, 35-20 204 St. Bayside, NY 11361. 718-279-2912

WANTED: Designation Discs for AK B.B. Require one each of; GND, ANT, +A, +B, +20, -AB. All or any will be gratefully appreciated for cash! Fred Creed, VE3DZ, 503-283 Fairway North, Kitchener, ONT, Canada. N2A 2P1.

WANTED: Tone-Beam tube for Atwater Kent Model #612 Console. Words "Duovac" and "Tune-A-Lite" printed on brass tube base. Also need one (1) calibrated (0-100) tuning knob for Atwater Kent Model #20 battery set. Sam W. Wrenn, 2314 Seminole #1207, Arlington, TX 76010

WANTED: Good power transformer for 1930 RCA Radiola Model 80. Game transformer is used in Radiola Models 82 and 86. Ted Hannah, 11106 Bybee St., Silver Spring, MD 20902. Tel: 301-649-2319

FOR SALE: 1989 Olde Tyme Radio Services Directory, lists suppliers of services related to Radio & TV. only \$2.50 ppd. Andrew Mooradian, 5 Priscilla Lane, Winchester, MA 01890

WANTED: Oscilloscopes of the 30's with 3" or smaller CRT. Not working is OK if complete, inside and out. Also want 1" to 3" CRT's for early scopes. Have many radio's, T.V.'s, parts literature to swap or will buy. John Kendall, P.O. Box 436 Fallston, MD 21047.

WANTED: Oscilloscopes of the 30s with 3" or smaller CRT. Also want 1 - 3" CRT's & manuals for early scopes. Have many radio's, TV's, tubes, parts, John Kendall P.O. Box 436, Fallston, MD 21047

FOR SALE: 1946 Philco portable model 46-350. \$55.00 & postage. Pic sent upon request. Jim Coleman, P.O. Box 2348, Pasadena, CA 91102 (818) 449-4000 ext. 173

FOR SALE: for America's most comprehensive Sales List of radios, TVs, speakers, magazines, etc. available, send \$1.50 for my most current list. Also buying radio/tv collections. Jim Clark Enterprises, Dept. ARCA, 1292 Starboard, Okemos, MI 48864. (517) 349-2249

SALE: The 1988 Catalog of numbers of items are listed of old radio gear. Tubes - parts - many things you are looking for to build and restore. Send now for the latest listings. Antique Electronics Supply P.O. Box 1810, Tempe, AZ 85281

WANTED: To complete my collection of Hallicrafters artifacts am still looking for unusual items of this manufacturer - sets - receiving and transmitters paper items - or what have you? Would be great to hear from former employees of this concern!! Max DeHenseler, 333 East 43rd St. New York City, NY 10017 Apt. 919

WANTED: Early battery superhets other than RCA. Especially screen grid types. Sodian receiver. Sleeper receiver #3300.

FOR SALE: Direct replacements for WD11 tubes - e.g. WE 215 mounted on a WD11 base. Charles Rhodes, 64 S. River Road, Edgewater, Maryland 21037 (301) 266-3691

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THE "FREE POWER" RECEIVER

by Bud Bedker

Part II

After reading about Bud's Free Power Set we had some questions. You probably do too. Some of them are answered below.

(Q) Can you tune in the station used as the power source?

(A) Yes, this is the most powerful station on the dial and gives enough signal for both purposes. It is more difficult to tune in this station. There is some distortion unless you tune very carefully.

(Q) Wouldn't more power be available if three different stations were used for the three power supplies?

(A) No. You might think this would be true but it doesn't work out that way. Also if three stations were used for power there would be three more difficult to receive instead of just KB.

(Q) How much power can you get from your attic antenna?

(A) On a good day the rectified D.D. will forcefully peg a 1 Ma meter. The voltage can be well over 16 volts! The set will play well on much less power than this.

(Q) What is the purpose of the fine tuning capacitor shown just to the left of center on the front panel of the set (Figure six)?

(A) This capacitor is not shown on the Figure one schematic. The set works fine with out it. Bud has connected it in parallel with the antenna tuning capacitor, C1. This allows C1 to track closer to the same setting as the other tuning capacitors.

(Q) How do the three power supplies work?

(A) There are three power supplies in two tuned circuits. Two supplies power the RF stage. One is negative, the other is positive. This gives Q1 twice the B+ voltage. The single isolated supply powers both audio stages.

(Q) What is the best speaker to use?

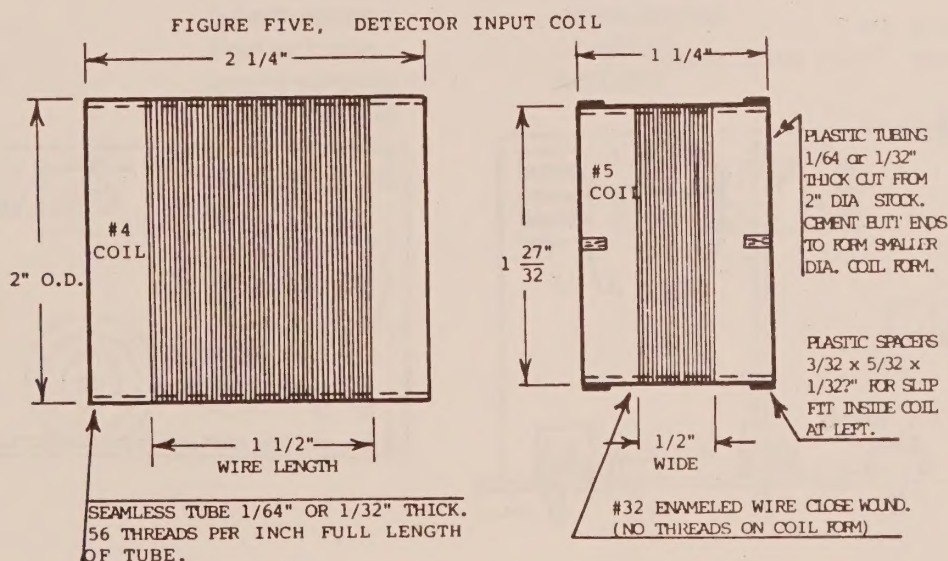
(A) The best sounding and most efficient speaker is the RCA UZ 1325 or UZ 1320. It seems to out perform all others and you need a good speaker.

(Q) How is the best way to operate the set?

(A) First tune the power supplies by adjusting C7 and C8. Then tune C1 to receive a station. Then you can tweek up all of the controls for best performance. Expect interactions between controls. Once the power supplies have been tuned, C7 and C8 should require little or no further adjustment. Stations may be received with L2 of the antenna coil at any position. Once everything is tuned, you will find that L2 never needs to be rotated more than about 10% of the total 360° range. To change stations readjust C1 until the desired station is received. Then retune all of the front panel controls.

(Q) Can you say more about cutting down capacitor C1?

(A) Any conductive material can effectively short the E field vector of the radio wave. It is therefore desirable to minimize metal in the set. When cutting the corners from the condenser frame be very careful that no filings are caught in the bearings.



WIND ALL COILS IN THE SAME DIRECTION

CUT THREADS ONLY DEEP ENOUGH TO HOLD # 32 WIRE IN POSITION.
4 COIL ONLY. USE REGULAR THREAD CUTTING TOOL—REAL SHARP.

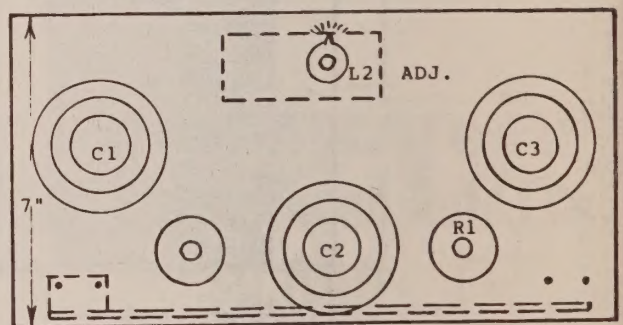
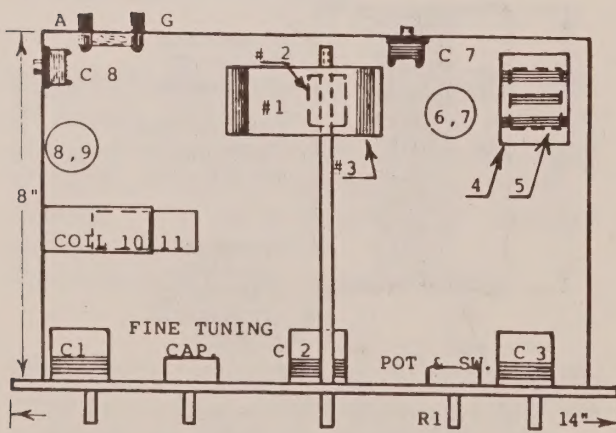
ELECTRONIC PARTS LIST

Free Power Receiver

C1	0.000365 Mfd	variable, see figure 3
C2	0.000365 Mfd	variable, see figure 3
C3	0.000365 Mfd	variable, see figure 3
C4	0.0005 Mfd	fixed capacitor
C5	0.05 Mfd	fixed capacitor
C6	0.05 Mfd	fixed capacitor
C7	100K10 Johnson	Variable capacitor
C8	100K10 Johnson	variable capacitor
C9	47 Mfd, 50 volt	electrolytic
C10	50 Mfd, 25 volt	electrolytic
C11	50 Mfd, 25 volt	electrolytic
C12	0.005 Mfd	fixed capacitor
Q1	2N410 Transistor	RF Amplifier
Q2	2N1305 Transistor	Audio Amplifier
Q3	2N1305 Transistor	Audio Output
Q4	1N34A Diode	Detector (4 req'd)
R1	100 K ohm	potentiometer
R2	1.1 K ohm	resistor
R3	47 K ohm	resistor
R4	47 K ohm	resistor
R5	27 K ohm	resistor
R6	1.0 megohm	resistor
SP1	UZ 1325 RCA speaker	
L1	Antenna coil Assy, see figure 4	
L2	Antenna coil Assy, see figure 4	
L3	Antenna coil Assy, see figure 4	
L4	Detector Rf input coil Assy, see figure 5	
L5	Detector RF input coil Assy, see figure 5	
L6, 7	Power Supply RF coils, see figure 2	
L8, 9	Power Supply RF coils, see figure 2	
L10, 11	Power Supply RF coils, see figure 2	
SW1	Antenna & On/Off Switch	

FIGURE SIX

LAYOUT - FREE POWER RADIO



FURTHER INFORMATION, FREE POWER SET

When tuning the power supplies, C7 and C8 should be adjusted very carefully at the same time that the primary and secondary windings of the power supply RF coils are slipped in and out. It may be necessary to alter the number of turns on the primary coils (L6, L9 or L10) to match the frequency of the power source station. The vari-coupler dial (L2 knob) can be a pointer type with a 20 deg. scale marked on the front panel. This control is a selectivity control. It is adjusted to fairly broad tuning for greatest volume or selective tuning to separate two closely spaced stations with only a slight reduction in volume.

The listing below is a log of stations received on a typical day in Buffalo, NY.

LOG OF STATIONS RECEIVED FREE POWER RECEIVER 12 DECEMBER 1987

DAYTIME 1 PM TO 2 PM

WWKB 1520	Good volume
WSYL 1400	Good Volume
WXRL 1300	Good Volume
WECK 1230	Good volume
WHAM 1180	Fair volume
WHTT	Good volume
CFRB	Good volume
WEBR	Good volume
CHML	Good volume
FR??	Good volume
CFTR	Fair volume
WJR	Fair volume
CBC	Good volume
CJRN	Good volume
CJRN	Good volume
CFCO	Fair volume
CKTB	Good volume
CKEY	Fair volume
WGR	Good volume
CKLW	Good volume
CJFC	Fair volume
WBEN	Good volume

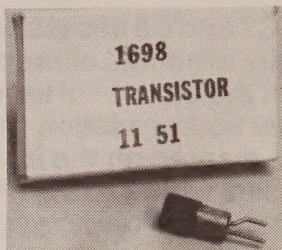
NIGHTTIME ADDED STATIONS

(will fade in and out)	
WWVA	WRVA
WBZ	WABC
WNBC	WSM
WMAQ	KYW
WGY	WLW
KMOX	WFAA
KDKA	WOR
WOWO	WHO
WLS	WCKY
WTIC	

(Many more
stations can
be received
on good
nights.)

TRANSISTOR TOPICS

By ROSS SMITH



THE 1698 TRANSISTOR

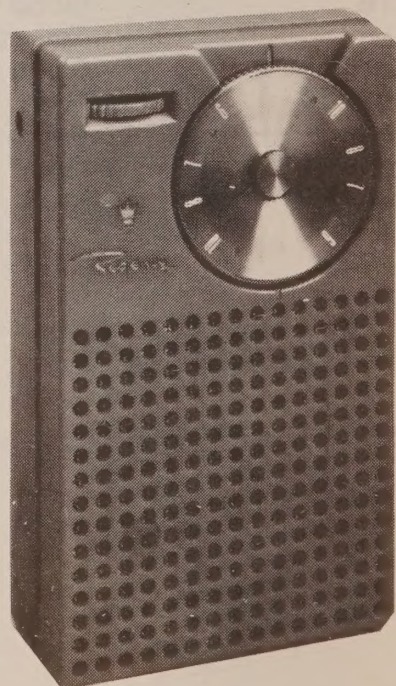
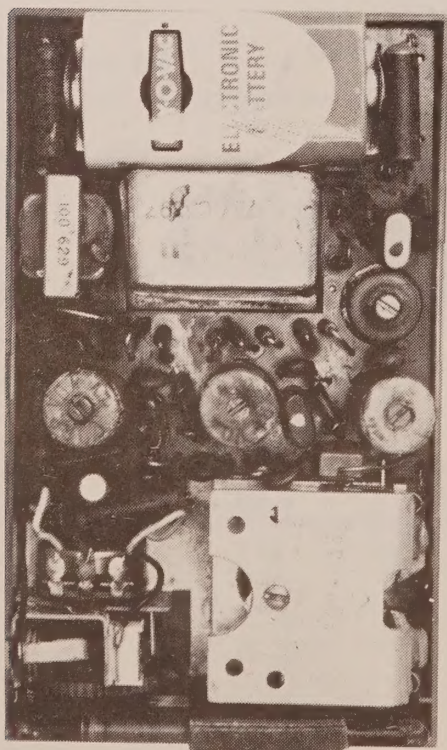
In the Spring of 1952, Bell Telephone Laboratories offered prototype transistor 1698 to industry for evaluation and experimentation. Fortunately, I was able to convince my immediate superior that we should order two transistors in order to find out what this new solid state business was all about. The type 1698 is a N-P-N grown junction transistor that operates with 22½ volts D.C.

I breadboarded an audio amplifier circuit with the two transistors, using telephone line transformers for proper matching. There were no transistor matching transformers on the market at that time. The amplifier worked quite well, driving a 12 inch dynamic speaker to full room volume with a one volt output phono cartridge. The "Magic Box With No Tubes" was demonstrated before the company foremen and engineer's banquet that year. Note

the date of manufacture, November 1951, on the carton shown above.

In the same year, Western Electric made available the 1698A for amateur and home builders. Several articles on transistor circuits came out in the 1952 magazines including "Now you can build a transistor radio" in October Popular Science, by Howard G. McEntee. This was a three transistor set using the 1698A for a detector and two stages of audio amplification, operating on a 45 volt B battery. The article warns that one should disconnect the outside aerial during lightning storms to prevent induced current from burning out the first transistor.

NOTE: President Lloyd McIntire and the writer invite ARCA members to make contributions to TRANSISTOR TOPICS. We would like to make this a continuing column in each issue of the Gazette. Please send articles to Ross Smith, 1133 Strong Ave., Elkhart, IN 46514



THE MIDGET RECEIVER

In large measure, the mantel sets are fairly similar in cabinet design, although there are outstanding features to distinguish them apart—curved peaks for some, futuristic designs in others, one or two with a clock inserted in the face of the cabinet.

In the matter of technicalities of these small sets there is not a great deal of difference, although every month or so some one manufacturer came out with a change or two to furnish opportunity for a "new line."

Let's look at an "average" set and see what's in it. Here are the specifications and work sheet for one of the factories: D.C. voltage into filter, 300; d.c. voltage out of filter to —45 plate, 225; d.c. voltage to r.f. plate, 175; d.c. voltage to power detector plate, 50; to —45 grid, 45; to power detector screen, 22 maximum (volume control); to power detector cathodes, 1 to 10; 40-volt surge with tubes removed; a.c. voltage with side transformer secondary, 360; a.c. voltage r.f., power detector, -45 filament, 2.2; a.c. voltage -80 filament, 4.9.

The speakers, small sized, are ordinarily full dynamic, especially built to match the receiver—special field winding, 2400-ohm and a special voice-coil spider peaked approximately 80 cycles. Rola, Magnavox and Lansing speakers seem to predominate in the western factory make-up.

A.F. couple—resistance couple of special design (not Loftin-White), with 500 volts maximum, designed for flat curve amplification and minimum plate voltage and drain, 300 volts maximum at source.

R.F. system—two stages sharply tuned screen-grid r.f. with coils designed for maximum gain per stage without the necessity of shields, thereby preventing the losses incurred through the use of shields; three-gang condenser.

In this the gain of the r.f. channel is equal to the average receiving set which employs three stages with shields. The inter-stage coupling is minimized through proper coil design and proper arrangement of coils on the chassis.

Oscillation is obtainable and controllable, thus adding considerably to gain and selectivity with a fairly even distribution of stations at the lower end of the dial.

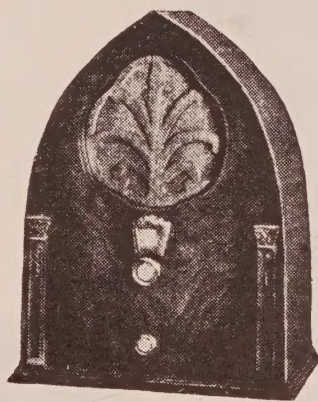
The volume control is practically perfect, without loss of tone quality at any setting, and there is no absorption or loss in gain at the maximum setting.

It controls the r.f. bias, power detector screen and power detector simultaneously, thereby incurring no over-loading of electric strain on any part of the circuit; smooth and positive in operation, not subject to excessive wear and thus necessitating frequent replacement.

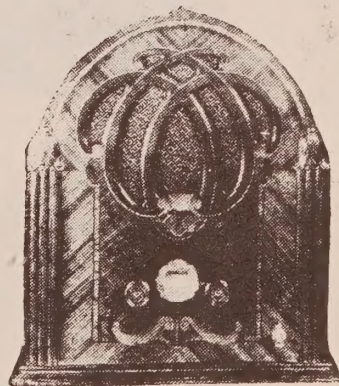
In the filter system, the speaker field acts as a choke; condensers, 16 mfd. total. This is of the electro-chemical type and is not subject to corrosion or seepage. The voltage rating is conservative, self-healing in the event of punctures and perfectly sealed from moisture.

The power transformer is conservatively rated, is well insulated, designed for effective cooling, L-shaped core allowing coils to be separated and resulting in better ventilation, mounted on chassis for free air circulation.

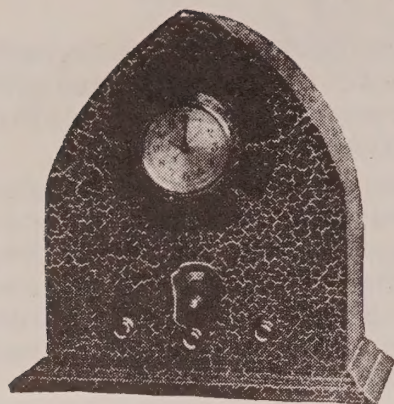
So this five-tube set—three screen grids (one is the power detector), a -45 and a -80—can be taken as an "average" mantel type set.



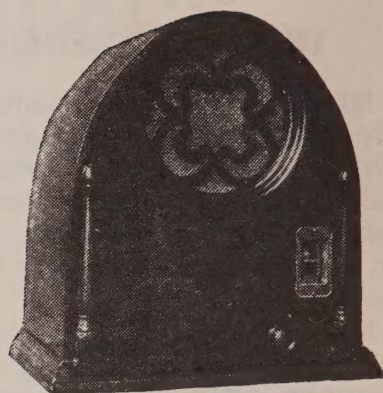
Zaney-Gill Corp.



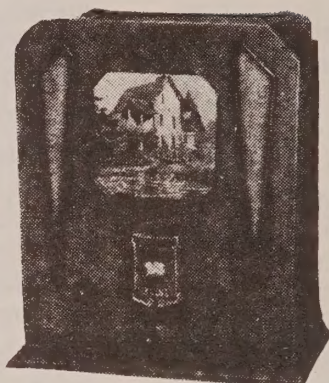
*Colonial
Radio Mfg. Co.*



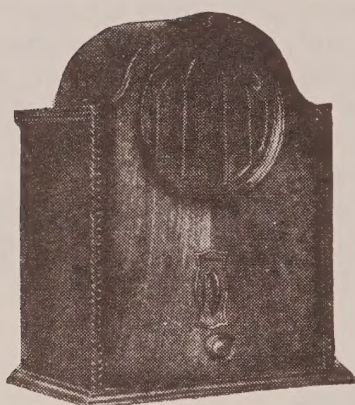
*Woodstock
Elec. Corp.*



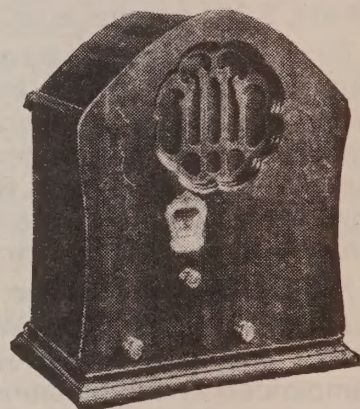
*Atchison
Radio Mfg. Co.*



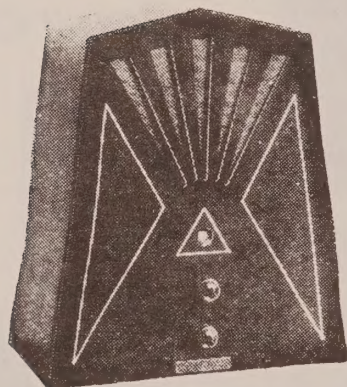
Flint Radio Co., Inc.



Republic Radio Co.

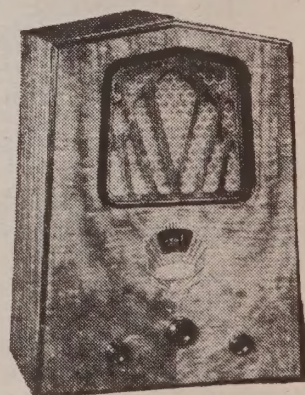


Transformer Corp. of Amer.

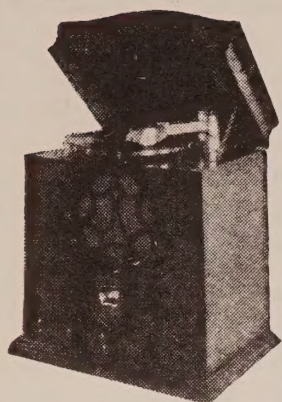


Plymouth Radio Corp.

*Davison-Haynes
Mfg. Co.*

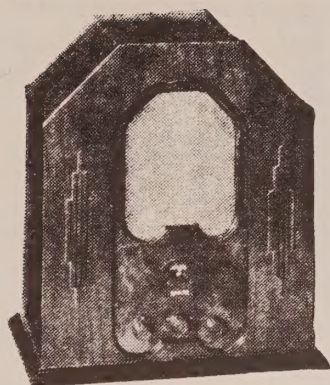


*Pierce Airo,
Inc.*

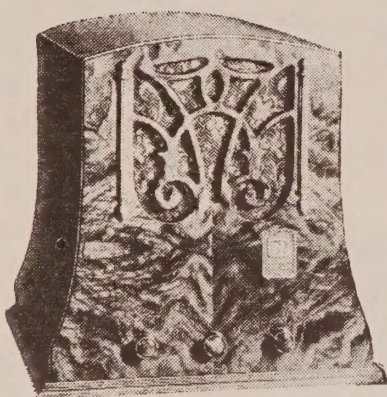


*Cardinal Radio
Mfg. Co.*

*Gray-Danielson
Mfg. Co.*



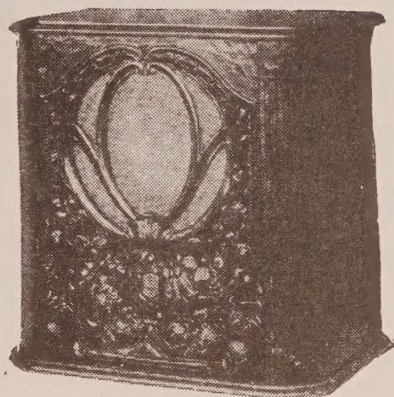
Colin B. Kennedy Corp.



Crosley Radio Corp.



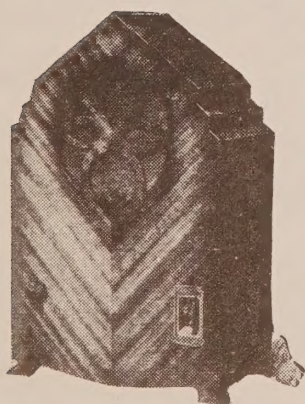
The Sterling Mfg. Co.



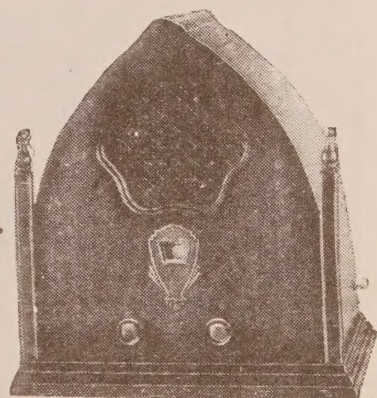
Paterson Radio Corp.

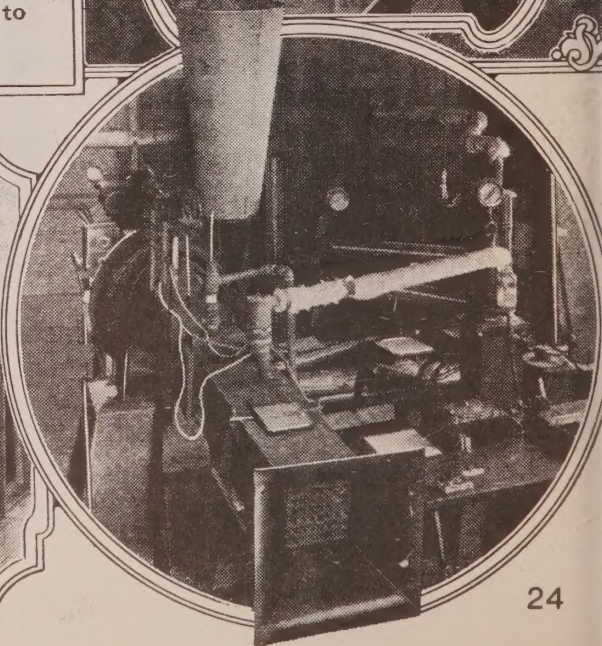
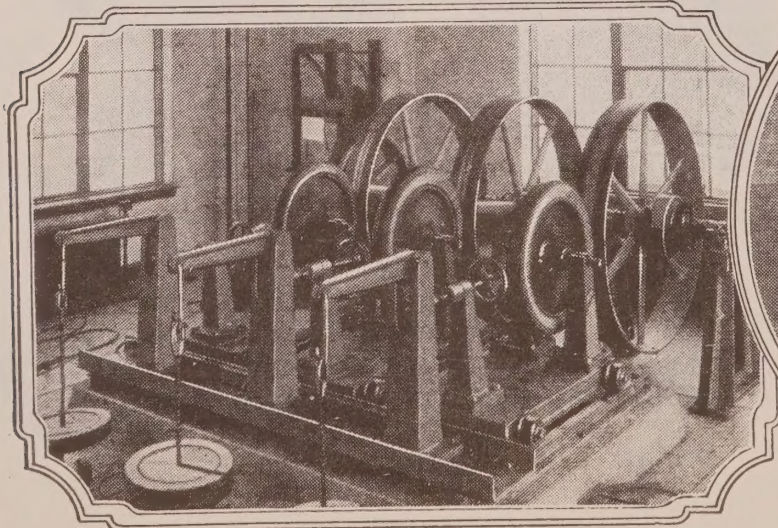


Advance Elec. Co.



*U. S. Radio &
Television Corp.*





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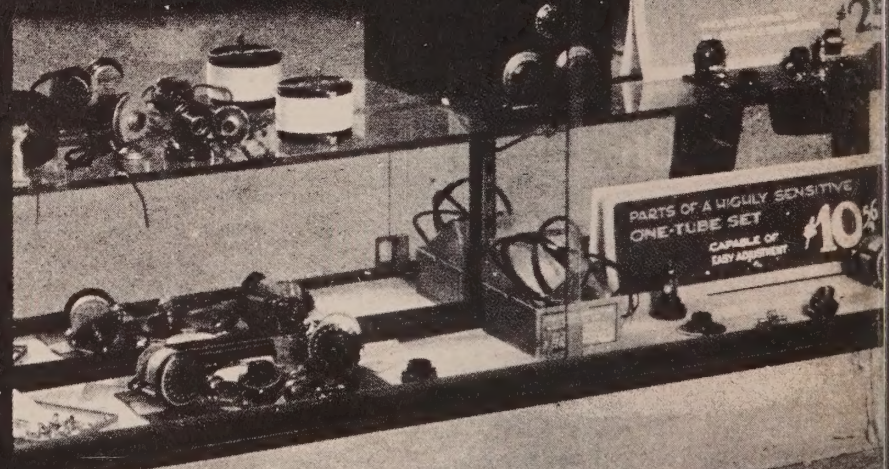
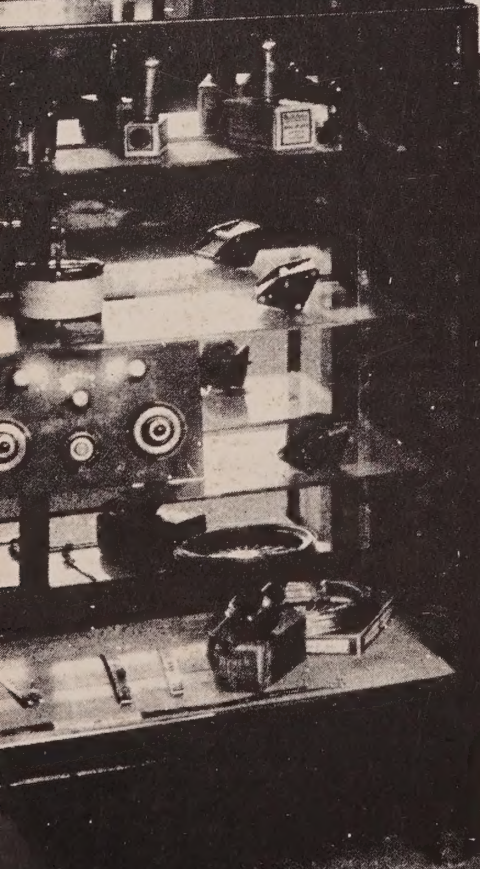
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